

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	0	("3998944453343552662175266218531284153564055736056586893362006806240879642865465237146680127").PN.	USPAT; USOCR	OR	OFF	2004/10/13 10:40
S2	13	(("3998944") or ("4533435") or ("5266217") or ("5266218") or ("5312841") or ("5356405") or ("5736056") or ("5868933") or ("6200680") or ("6240879") or ("6428654") or ("6523714") or ("6680127")).PN.	USPAT; USOCR	OR	OFF	2004/09/21 15:52
S3	0	(antifungal antimicrobial) same insulation same fiber\$1 same binder	USPAT	OR	OFF	2004/09/21 15:54
S4	2	(antifungal antimicrobial) same insulation same fiber\$1 same binder	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/21 15:55
S5	161	(antifungal antimicrobial) same insulation	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/21 16:15
S6	22	(fungicide biocide) same insulation	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/23 09:34
S7	78	cellulos\$3 same (antifungal antimicrobial) same adhesive	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/21 16:52
S8	0	S7 same insulation	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/21 16:27
S9	0	S7 same drywall	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/21 16:28

S10	2	S7 same building	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/21 16:28
S11	32	cellulos\$3 same (antifungal antimicrobial) same adhesive and inorganic	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/21 16:55
S12	0	cellulos\$3 same (antifungal antimicrobial) same adhesive and inorganic adj fiber	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/21 16:55
S15	252	inorganic adj (fiber fibre) same insulation	USPAT	OR	ON	2004/09/22 14:04
S16	3	inorganic adj (fiber fibre) same insulation same randomly adj oriented	USPAT	OR	ON	2004/09/22 14:06
S17	56	inorganic adj (fiber fibre) same thermal adj insulation	USPAT	OR	ON	2004/09/22 14:06
S18	175	inorganic adj (fiber fibre) same thermal adj insulation	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2004/09/22 14:08
S19	23	inorganic adj (fiber fibre) same thermal adj insulation same adhesive	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2004/09/22 14:23
S20	1	("4022248").PN.	USPAT; USOCR	OR	OFF	2004/09/22 14:23
S21	0	(fungicide or biocide) same insulation same cellulos\$3	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/04/21 11:32
S22	3	(fungicide or biocide) same insulation and cellulos\$3	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/23 10:10

S23	5	("4648920"   "5318990"   "5340868"   "5623032"   "5661213").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2004/09/23 09:48
S24	14	(antifungal or antimicrobial) same insulation same cellulose\$3	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/23 10:03
S25	10	(antifungal or fungicide or antimicrobial or biocide) same batt same cellulose\$3	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/23 16:45
S26	1	("6399694").URPN.	USPAT	OR	OFF	2004/09/23 10:08
S27	111	(fungicide or biocide) and insulation and cellulose\$3	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/23 10:52
S28	6	("4331480").URPN.	USPAT	OR	OFF	2004/09/23 10:38
S29	207	(antifungal or anti-fungal or fungicide or antimicrobial or anti-microbial or biocide) same insulation	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/23 12:55
S31	62	S29 and cellulose\$3	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2004/09/23 10:55
S32	0	("2003/0170453").URPN.	USPAT	OR	OFF	2004/09/23 10:59
S33	0	(antifungal or anti-fungal or fungicide or antimicrobial or anti-microbial or biocide) same insulation same kraft	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/10/03 10:15
S34	3	(antifungal or anti-fungal or fungicide or antimicrobial or anti-microbial or biocide) same insulation and kraft	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/23 12:56
S35	217	insulation same kraft same cellulose\$3	US-PGPUB; USPAT; USOCR	OR	OFF	2004/09/23 13:05

S36	11	(antifungal or fungicide or antimicrobial or biocide) same batt same cellulose\$3	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/23 16:45
S37	1	fungicide same batt same cellulose\$3	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/23 16:46
S38	789	(fungicide or biocide) and insulation	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/23 16:47
S39	469	(fungicide or biocide) and insulation	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/23 16:47
S40	1	(fungicide not biocide) and insulation	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/23 16:48
S41	469	(fungicide or biocide) and insulation	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/06/23 18:42
S42	355	(fungicide) and insulation	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/23 16:49
S43	121	(fungicide) and insulation and cellulose\$3	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2004/09/23 16:49
S44	691	442/149	US-PGPUB; USPAT; USOCR	OR	OFF	2004/09/27 11:27

S45	49	442/149 and insulation	US-PGPUB; USPAT; USOCR	OR	OFF	2004/09/27 11:33
S46	32	S44 and kraft not insulation	US-PGPUB; USPAT; USOCR	OR	OFF	2004/09/27 11:34
S47	3	silver adj zeolyte	USPAT	OR	OFF	2004/10/13 10:41
S48	12	silver adj zeolyte	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2004/10/13 10:41
S49	4886	insulati\$3 and kraft and (copper sulfate trichloro-z adj hydroxydiphenol 5-chloro-2-(2, 4-dichlorophenoxy) adj phenol diiodomethyl-p-tolylsulfone adj 2-bromo-2 adj nitropropane-l 3-dio1 sodium adj z-pyridinethiol-l-oxide 2-(thiocyanato-methyl adj thio) adj berlzothiazole (TCMTB) 3-ido-2 adj propynyl-butyl adj carbamate phenyl-(2-cyano-2 adj chlorovinyl) adj sulfone)	US-PGPUB; USPAT; USOCR	OR	OFF	2005/04/21 11:32
S50	1	(anti-fungal antifungal fungicide antimicrobial anti-microbial biocide) same insulation same kraft	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/09/30 14:34
S51	64	(anti-fungal antifungal fungicide antimicrobial anti-microbial biocide) and insulation and kraft	US-PGPUB; USPAT; USOCR	OR	OFF	2005/04/21 13:11
S52	252	insulation and (bnpd tcmtb peo btcms phmb)	US-PGPUB; USPAT; USOCR	OR	OFF	2005/04/21 13:12
S53	5	insulation and (bnpd tcmtb peo btcms phmb) and kraft	US-PGPUB; USPAT; USOCR	OR	OFF	2005/04/21 13:15
S54	4	insulation and (bnpd tcmtb btcms phmb)	US-PGPUB; USPAT; USOCR	OR	OFF	2005/04/21 13:15
S55	234	(fungicide or biocide) and insulation and (percent\$3 ppm)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/06/23 18:43

S56	181	S55 and (adhesive binder)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/06/23 18:44
S57	739	(antimicrobial antifungal fungacide or biocide) and insulation and (percent\$3 ppm)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/06/23 18:46
S58	474	S57 and (adhesive binder)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/06/23 18:44
S59	158	(antimicrobial antifungal fungacide or biocide) same (percent\$3 ppm)and insulation	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/06/24 11:34
S60	187	insulation and facing and bituminous and adhesive	US-PGPUB; USPAT; USOCR	OR	OFF	2005/06/24 11:40
S61	2	S60 and (antimicrobial antifungal fungacide or biocide)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/06/24 11:34
S62	32	gypsum and facing and bituminous and adhesive	US-PGPUB; USPAT; USOCR	OR	OFF	2005/06/24 11:50
S63	70	gypsum and insulation and bituminous and adhesive	US-PGPUB; USPAT; USOCR	OR	OFF	2005/06/24 12:39
S64	17514	insulation same (fiber fibre)	US-PGPUB; USPAT; USOCR	OR	OFF	2005/06/24 12:40
S65	768	S64 and kraft	US-PGPUB; USPAT; USOCR	OR	OFF	2005/06/24 12:40
S66	387	S65 and cellulose\$4	US-PGPUB; USPAT; USOCR	OR	OFF	2005/06/24 12:42

S67	17	(antifungal or anti-fungal or fungicide or antimicrobial or anti-microbial or biocide) and S66	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/06/24 12:43
S68	17	toas.in.	US-PGPUB; USPAT; USOCR	OR	OFF	2005/06/27 14:09
S69	3257	knapp.in.	US-PGPUB; USPAT; USOCR	OR	OFF	2005/06/27 14:09
S70	0	knapp-kenneth.in.	US-PGPUB; USPAT; USOCR	OR	OFF	2005/06/27 14:09
S71	2	knapp-ken.in.	US-PGPUB; USPAT; USOCR	OR	OFF	2005/06/27 14:16
S72	378	certaineed.as.	US-PGPUB; USPAT; USOCR	OR	OFF	2005/06/27 14:16
S73	58	S72 and insulation	US-PGPUB; USPAT; USOCR	OR	OFF	2005/06/27 14:16
S74	5	S73 and kraft	US-PGPUB; USPAT; USOCR	OR	OFF	2005/06/27 14:16
S75	2	toas-murray.in.	US-PGPUB	OR	OFF	2005/09/30 14:14
S76	19	toas near murray	US-PGPUB	OR	OFF	2005/09/30 14:14
S77	3	(anti-fungal antifungal fungicide antimicrobial anti-microbial biocide) same insulation same kraft	US-PGPUB; USPAT; USOCR	OR	OFF	2005/09/30 14:35
S78	115	(anti-fungal antifungal fungicide antimicrobial anti-microbial biocide) same insulation and (kraft paper facing cellulose\$3)	US-PGPUB; USPAT; USOCR	OR	OFF	2005/09/30 14:35
S79	83	S78 and (percent\$3 ppm parts adj per adj million)	US-PGPUB; USPAT; USOCR	OR	OFF	2005/09/30 14:55
S80	46	S78 and (percent\$3 ppm parts adj per adj million) same (kraft paper facing cellulose\$3)	US-PGPUB; USPAT; USOCR	OR	OFF	2005/09/30 15:55
S81	46	S78 and (percent\$3 ppm parts adj per adj million) same (kraft paper facing cellulose\$3 pulp)	US-PGPUB; USPAT; USOCR	OR	OFF	2005/09/30 15:56
S82	37	S79 not S80	US-PGPUB; USPAT; USOCR	OR	OFF	2005/09/30 15:56
S83	3	batdorf-vernon-h.in.	US-PGPUB	OR	OFF	2005/09/30 16:17

S84	613	442/123.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2005/10/03 09:51
S85	29	S84 and insulation	US-PGPUB; USPAT; USOCR	OR	OFF	2005/10/03 10:03
S86	29	S84 and (fiberglass glass adj fiber gypsum) not S85	US-PGPUB; USPAT; USOCR	OR	OFF	2005/10/03 10:10
S87	359	S84 and (kraft paper cellulos\$3 facing) not S85 not S86	US-PGPUB; USPAT; USOCR	OR	OFF	2005/10/03 10:11
S88	17	S84 and (kraft (paper cellulos\$3) near3 facing) not S85	US-PGPUB; USPAT; USOCR	OR	OFF	2005/10/03 10:12
S89	17	S84 and (kraft (paper cellulos\$3) near3 facing) not S85 not S86	US-PGPUB; USPAT; USOCR	OR	OFF	2005/10/03 10:12
S90	5	(antifungal or anti-fungal or fungacide or antimicrobial or anti-microbial or biocide) same (kraft (cellulosic paper) near3 facing)	DERWENT; IBM_TDB	OR	OFF	2005/10/03 10:39
S91	1	toreki-william.in. and staab-gregory.in.	US-PGPUB	OR	OFF	2005/10/03 10:40
S92	1	"20030027889"	US-PGPUB	OR	OFF	2005/10/03 11:38
S93	26	("20020008092" "20020127399" "20030031898" "20030234068" "20030236043" "20040185204" "20040185211" "20040185212" "3998944" "4533435" "4764420" "5224957" "5266217" "5266218" "5312841" "5356405" "5567504" "5736056" "5868933" "6197805" "6200680" "6240879" "6399694" "6428654" "6523714" "6680127").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2005/10/03 11:38

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## Insulation and R-Values

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Insulation is a category of materials used in homes and other buildings to help them retain heat (or more technically, to help them resist the flow of heat).

The effectiveness of insulation is measured by its "R-Value". The higher a material's R-Value, the better it resists the flow of heat, and therefore, the better it insulates the building. For example, R-19 insulation retains heat better than R-11 insulation.

### How can I determine the R-Value of my insulation?

In those areas where insulation is exposed (typically in attics or basement floor joists) you have several options:

1. The R-Value may be printed on the insulation backing. You may be able to simply read its value.
2. You may be able to estimate the R-Value based on the thickness of the insulation. The most common materials sold for wall and ceiling insulation provide air-based insulation. That is, the materials trap air in tiny pockets, and the air provides the insulation. Each inch of thickness of your average air-based insulating material provides an R-Value of about 3. Therefore, a 3.5-inch thick batt of (average air-based) insulation provides an R-Value of about 11. A 6-inch thick batt of insulation provides an R-Value of about 19.

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## Insulation/R-Values

"R-value" signifies the ability of a material to resist heat flow. The higher the R-value, the greater the heat flow resistance. For instance, it's more difficult for heat to pass through R-19 insulation than it is to pass through R-11 insulation.

Some materials are naturally better insulators than others. For example, a six-inch batt of fiberglass insulation has an R-value of 19, while an eight-inch concrete block has an R-value of 1.04. Glass, like concrete block, also has little resistance to heat – a single pane of glass has an R-value of 1.13.

The following chart shows average R-values per inch of common insulating materials. Using this chart, you can determine the R-value of a particular amount of insulation from its thickness. For example, 8.5 inches of loose-fill mineral fiber insulation equals R-19. Because R-values per inch vary greatly between different insulating materials, always rate insulation by its R-value and not by inches.

### Weatherization and Insulation

PDF: 777 Kb

### Related Resources

#### Have Questions?

Review our FAQs or contact our Customer Service Center

### R-Values Per Inch For Common Insulating Materials\*

Insulating Material	Avg. R-Value Per Inch
<i>Batts or Blankets</i>	
• Mineral fiber (rock, slag or glass)	3.25
<i>Loose Fill</i>	
• Mineral fiber (rock, slag or glass)	2.2
• Cellulose (milled paper and wood pulp)	3.4
• Vermiculite, exfoliated	2.13
• Perlite, expanded	2.7
<i>Rigid Board and Slabs</i>	
• Expanded polystyrene, extruded (cut-cell surface) and molded bead-type	4.0
• Expanded polystyrene, extruded (smooth-cell surface)	5.0
• Expanded polyurethane, refrigerant 31 exp.	6.25
• Polyisocyanurate	7.04
<i>Building Board Sheathing, regular density</i>	2.64

NOTE: Styrene and urethane foams may present smoke- and flame-spread problems if improperly used. Look for UL approval for cellulose. Untreated cellulose is highly flammable.

\* R-values from the ASHRAE Fundamentals Handbook. The values given are average R-values. If needed, ask insulation manufacturers for the R-values of insulating materials not listed above.

The table below lists R-values for commonly available thicknesses

of residential ceiling, wall and floor insulation:

<b>Insulation Type</b>	<b>Inches Needed For:</b>				
<b>Ceiling Insulation</b>	<b>R-11</b>	<b>R-19</b>	<b>R-22</b>	<b>R-26</b>	<b>R-30</b>
<i>Batts or Blankets</i>					
● Mineral fiber (rock, slag, glass)	3.5	6	6.5	8	9
<i>Loose Fill</i>					
● Mineral fiber (rock, slag, glass)	5	8.6	10	12	13.6
● Cellulose	3.2	5.6	6.5	7.6	8.8
<b>Frame Wall Insulation</b>	<b>R-11 R-19</b>				
<i>Batts or Blankets</i>					
● Mineral fiber (rock, slag, glass)	3.5	6			
<b>CBS Wall Insulation</b>	<b>R-3 R-5</b>				
<i>Batts or Blankets</i>					
● Mineral fiber (rock, slag, glass)	.75	1.5			
<i>Rigid Board</i>					
● Polyisocyanurate	.5	.75 *			
● Expanded Polystyrene (molded bead-type)	1.0	1.5			
<b>Floor Insulation (suspended frame floors only)</b>	<b>R-7</b>	<b>R-11</b>	<b>R-19</b>		
<i>Batts or Blankets</i>					
● Mineral fiber (rock, slag, glass)	2	3.5	6		

\*.50 with 3/4" dead air space

Progress Energy's minimum recommendations for house insulation:

- In Carolina:
  - Ceiling: R-30
  - Wall: R-11 to R-15 in frame wall
  - Floor: R-19 in floors
  
- In Florida:
  - Ceiling: R-19 to R-30
  - Wall: R-11 in fram walls, R-5 in CBS walls
  - Floor: R-11 in floors (suspended frame only)